NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, D.C. 20594

UAS Aerial Imagery Report

2/12/2020

A. ACCIDENT CEN20MA044

Location:	Lafayette, LA.
Date:	Dec 28, 2019
Time:	0921 Central Standard Time (CST)
Event:	N42CV PA31T accident

B. PERSONNEL

UAS RPIC:	Bill English NTSB UAS Program Lead Washington DC

C. ACCIDENT SUMMARY

On December 28, 2019, about 0921 central standard time, a Piper PA 31T airplane, N42CV, was destroyed when it was involved in an accident near Lafayette Regional Airport/Paul Fournet Field (LFT), Lafayette, Louisiana. The commercial pilot and four passengers were fatally injured. One passenger sustained serious injuries. Two individuals inside a nearby building sustained minor injuries and one individual in a car sustained serious injuries. The airplane was operated as a Title 14 Code of Federal Regulations Part 91 personal flight.

D. DETAILS OF IMAGERY

1.0 Equipment and Procedures

Equipment

Flights to photo-document and map the area of the crash were conducted on December 29 and 30, 2019, using one of the NTSB DJI Phantom 4 Advanced small unmanned aircraft systems (sUAS, or drone). The drone is equipped with a dual GPS/GLONASS receiver which provides georeference information on all still photos. The drone is equipped with an FC6310 camera using the Sony Exmor 1" CMOS sensor, with a focal length of 8.8 mm. Still photo resolution is 20 megapixels in JPG or RAW format, the camera is capable of video resolution of 4K HD up to 120 frames per second.

Additional flights with the NTSB Parrot Anafi were conducted to compare with the

Phantom imagery. No additional information relevant to the investigation was gathered in the test flights.

Ground control points (GCP) and locations of select wreckage were taken with a Trimble GEO7X differential GPS receiver in the wreckage area.

Procedures

The accident site encompassed the parking lot of a post office, and an adjacent open field. The wreckage area was in Class C airspace, approximately 1.5 miles from the departure end of runway 22L at KLFT. There were no significant terrain, environmental, or obstruction hazards. The flight was conducted under 14 CFR 107 with Special Government Interest airspace approval and 107.51 reduced weather minima waiver. Weather conditions were generally MVFR to VFR with passing rain showers.

On December 29, the drone was flown in a nadir single grid pattern at 125 feet over the main wreckage site to build a quick overview map (see Processing section). Multiple double grid flights were conducted at 100 feet covering the entire area from initial impact with powerlines to the farthest portion of the wreckage to create a 3D point cloud and detailed orthomosaic map. Video along the flight and wreckage path was taken.

The test Anafi flights were conducted on the morning of December 30, and the Phantom was used to take higher elevation viewpoint and panoramic photos.

Total mission time including set-up, gathering ground control points, flights, and initial processing was 10 hours over the 2 day period. Full resolution processing ran overnight on the evening of December 29.

Processing

The initial map of the area was processed using Pix4D REACT software, to create a rapid low-resolution orthomosaic of the main wreckage area for use on scene. A full resolution 3D point cloud and orthomosaic map were processed overnight and excerpts with select measurements are included below. The relative accuracy (measurements within the map) was calculated at 0.7 inches (2x ground sample distance). The GCPs were processed using the Abdalla Hall ULL Continuously Operating Reference Station (TONY), and resulted in a positional (absolute) accuracy of +/- 5cm. Select products are included in the docket for this investigation.

2.0 Imagery products

Over 1700 high resolution photos and videos were gathered. Excerpts from photos, videos and the full resolution point cloud and map are included below.

Figures 1 and 2 are overview photos of the impact area and wreckage path. Significant points and directions, determined from the orthomap, are indicated on the photos.

Figure 1 – Overview looking back toward initial impact point

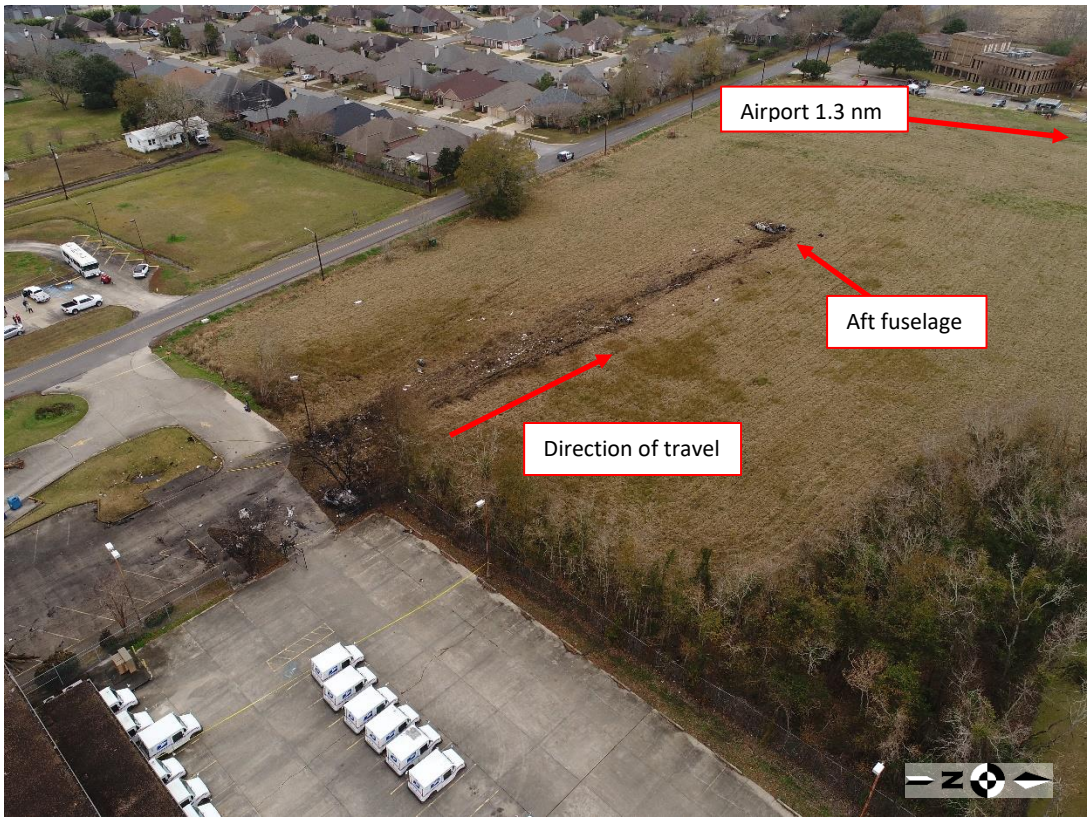

Figure 2 – View from over the post office looking west.

Figure 3 is an excerpt of the Google Earth orthomosaic with select measurements overlaid.

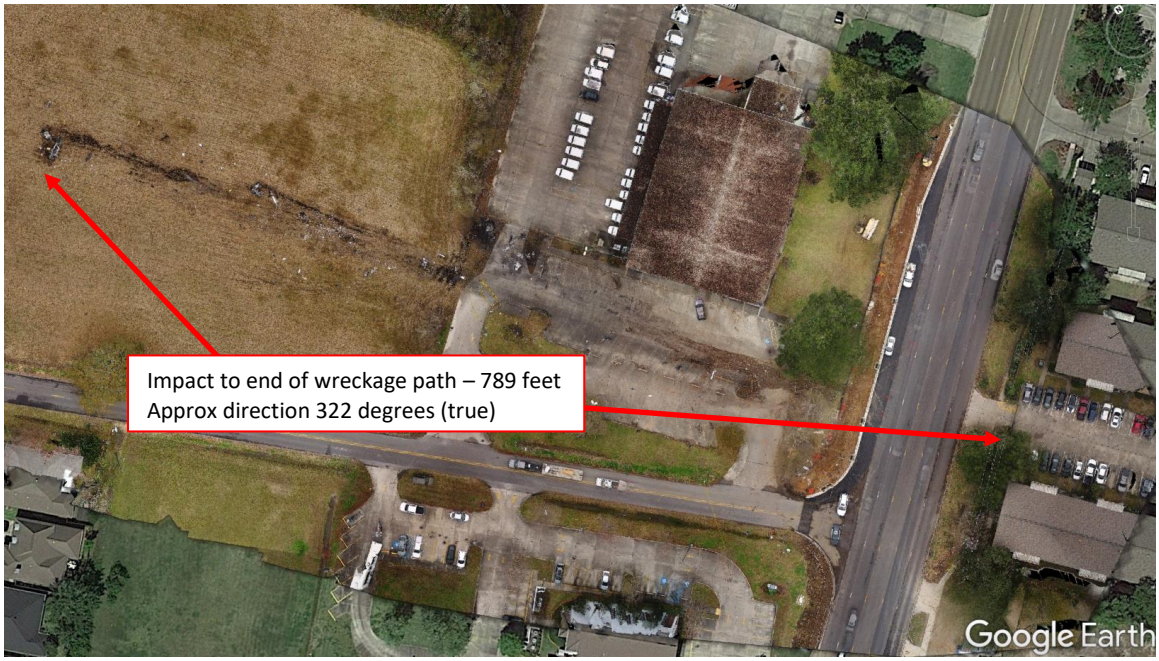

Figure 3 – Google Earth orthomosaic overall

Figure 4 is a view of the eastern portion of the orthomosaic with significant items labeled.

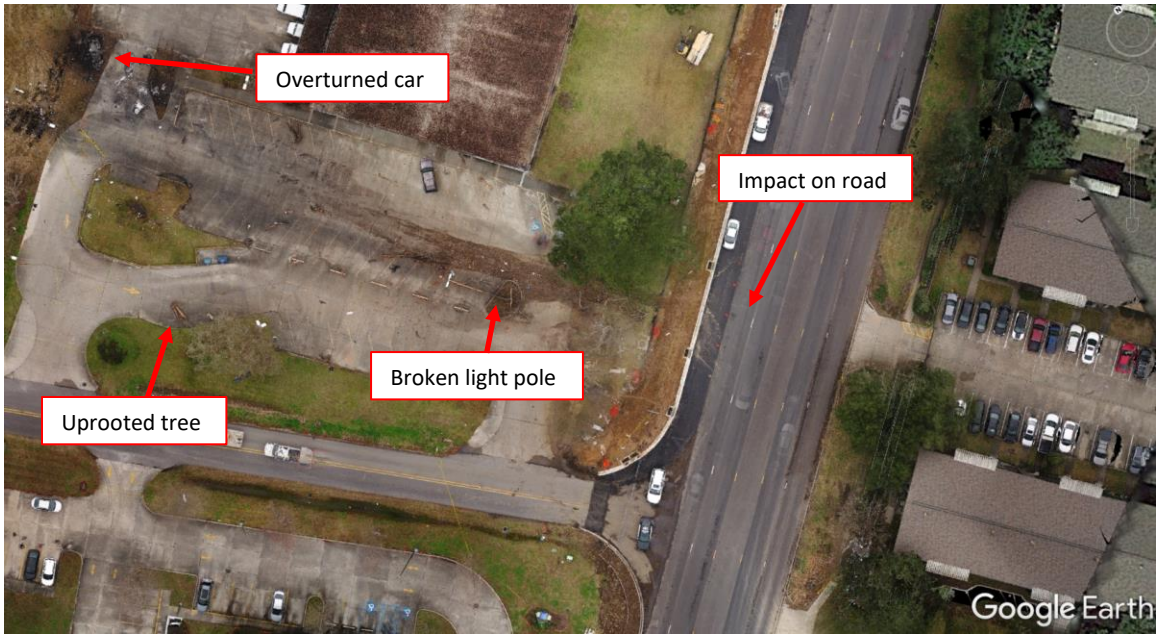

Figure 4 – Eastern portion of orthomosaic.

Figure 5 is the western portion of the orthomosaic with select items labeled.

Figure 5 – Western portion of orthomosaic

Figure 6 is an oblique view of the 3D point cloud looking to the east-northeast.

Figure 6 – Overall 3D point cloud

An estimation of a 31.8 degree angle between tree strike marks at the impact point, directly below the powerlines, was made by drawing a polyline between broken branch marks, and solving for the resultant right triangle. (Distance between points D = 2.24m, height difference H = 1.18m; arcsin H/D = 31.8deg)

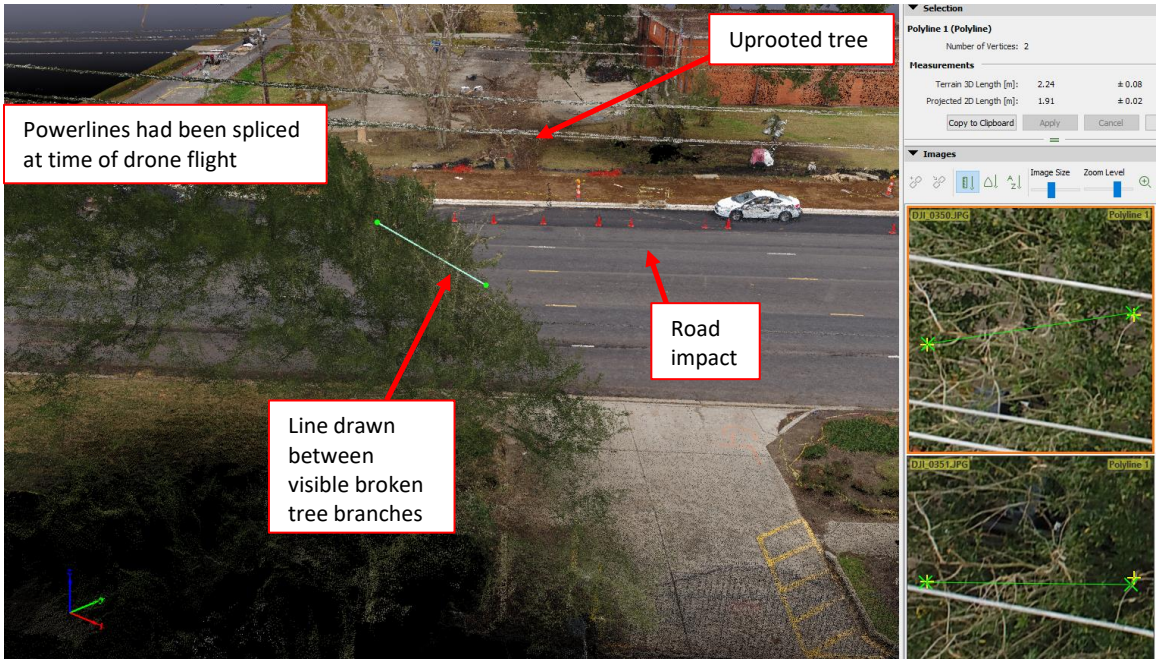

Figure 7 – Estimated angle of tree strike

Using the same process as above, the angle from the uppermost powerline, to the impact mark in the road, was calculated as 23.5 degrees.

Figure 8 – Angle from powerlines to road impact

3.0 Attachments

1. Point cloud
2. Google Earth kmz file
3. Spherical panoramic photo
4. Video along wreckage path